

IN THE CLAIMS

The text of all claims under examination is submitted, and the status of each is identified. This listing of claims replaces all prior versions, and listings, of claims in the application.

1. (currently amended): A method for forming a functional layer on an inorganic or organic substrate, wherein

a) a low-temperature plasma, a corona discharge, high-energy radiation and/or a flame treatment is caused to act on the inorganic or organic substrate,

b) 1) at least one activatable initiator or 2) at least one activatable initiator and at least one ethylenically unsaturated compound is/are applied in the form of a melt, solution, suspension or emulsion to the inorganic or organic substrate, there being incorporated in the activatable initiator and/or the ethylenically unsaturated compound at least one function-controlling group which results in the treated substrate's acquiring desired surface properties, characterized in that the function-controlling group is composed as follows: and

- i) a hydrophilic or hydrophobic group for controlling hydrophilicity/hydrophobicity,
wherein the hydrophilic group is selected from the group consisting of acrylic acid,
acrylamide, acetoxystyrene, acrylic anhydride, acrylsuccinimide, allyl glycidyl ether,
allylmethoxyphenol, polyethylene glycol (400) diacrylate, diethylene glycol diacrylate,
diurethane dimethacrylate, divinyl glycol, ethylene glycol diglycidyl ether, glycidyl
acrylate, glycol methacrylate, 4-hydroxybutyl methacrylate, 2-hydroxyethyl acrylate, 2-
hydroxyethyl methacrylate, N-(2-hydroxypropyl)methacrylamide, methacryloxyethyl
glucoside, nitrostyrene, sulfoethyl methacrylate, sodium salt of 3-sulfopropyl acrylate, 4-
vinylbenzoic acid, vinyl methyl sulfone, vinylphenylacetate and vinylurea
and
the hydrophobic group is selected from the group consisting of tert-butyl acrylate,
styrene, butyl trimethoxysilane, cyclohexyl acrylate, decanediol dimethacrylate, divinyl-
benzene, 2-(2-ethoxyethoxy)ethyl acrylate, 1H,1H-heptafluorobutyl acrylate, benzyl
acrylate, 1H,1H,7H-dodecafluoroheptyl methacrylate, naphthyl acrylate,
pentabromophenyl acrylate, trifluoroethyl acrylate and vinyltriphenylsilane,

- ii) an acid, neutral or basic functional group for controlling acid/base properties,
- iii) a functional group having high or low incremental refraction, for controlling the refractive index,
- iv) a functional group having an effect on the growth of cells and/or organisms, for controlling biological properties,
- v) a functional group having an effect on combustibility, for controlling flame-retardant properties, and/or
- vi) a functional group having an effect on electrical conductivity, for controlling anti-static properties,

c) the coated substrate is heated and/or is irradiated with electromagnetic waves, the substrate thereby acquiring the desired surface properties.

2-6. (cancelled).

7. (currently amended): A method according to claim-~~2~~1, wherein the functional group controlling acid/base properties is ~~chosen from~~ a carboxylic acid, sulfonic acid, phosphoric acid, sulfuric acid, phenolic acid or amino acid group or an amino, pyridine, pyrimidine, piperidine, pyrrole or imidazole group.

8. (currently amended): A method according to claim-~~2~~1, wherein the functional group controlling acid/base properties is ~~chosen from~~ allylamine, 2-aminoethyl methacrylate, 4-vinylpyridine, vinylpyrrolidone, vinylimidazole, morpholinoethyl acrylate, acrylic acid, 2-propene-1-sulfonic acid, sorbic acid, cinnamic acid or maleic acid.

9. (currently amended): A method according to claim-~~2~~1, wherein the group controlling the refractive index is ~~chosen from~~ a benzyl group, a partially or fully halogenated benzyl group, or a partially or fully halogenated alkane or alkene or alkyne group.

10. (currently amended): A method according to claim-~~2~~1, wherein the group controlling the refractive index is ~~chosen from~~ benzyl acrylate, 1H,1H,7H-dodecafluoroheptyl methacrylate, 1H,1H-heptafluorobutyl acrylate or trifluoroethyl acrylate.

- 11. (currently amended):** A method according to claim ~~2~~ 1, wherein the group controlling biological properties is ~~chosen from a group having anti-fouling properties, such as copper(II) methacrylate, dibutyltin maleate, tin(II) methacrylate or zinc dimethacrylate.~~
- 12. (currently amended):** A method according to claim ~~2~~ 1, wherein the group controlling biological properties is ~~chosen from a group that promotes the growth of biological systems, wherein the group that promotes the growth of biological systems is chosen from a succinimide, glucoside or sugar-~~ group.
- 13. (currently amended):** A method according to claim **12**, wherein ~~as a~~ the group that promotes the growth of biological systems is ~~chosen from~~ N-acyloxysuccinimide or 2-methacryloxyethyl glucoside.
- 14. (currently amended):** A method according to claim ~~2~~ 1, wherein the group controlling flame-retardant properties is ~~chosen from a~~ fully or partially chlorinated or brominated alkane or nitrogen- or phosphorus-containing group.
- 15. (currently amended):** A method according to claim ~~2~~ 1, wherein the group controlling flame-retardant properties is ~~chosen from~~ tribromoneopentyl methacrylate, bis(2-methacryloxyethyl) phosphate or monoacryloxyethyl phosphate.
- 16. (currently amended):** A method according to claim ~~2~~ 1, wherein the group controlling anti-static properties is ~~chosen from~~ a tertiary amino, ethoxylated amino, alkanol amide, glycerol stearate, sorbitan or sulfonate group.
- 17. (currently amended):** A method according to claim ~~2~~ 1, wherein the group controlling anti-static properties is ~~chosen from~~ 2-diisopropylaminoethyl methacrylate, 3-dimethylaminoneopentyl acrylate or oleylbis(2-hydroxyethyl)amine, stearyl acrylate, or vinyl stearate.
- 18. (previously presented):** A method according to claim **1**, wherein the inorganic or organic substrate is or comprises a synthetic or natural polymer, a metal oxide, a glass, a semi-conductor, quartz or a metal.
- 19. (previously presented):** A method according to claim **18**, wherein the organic substrate is or comprises a homopolymer, block polymer, graft polymer and/or copolymer and/or a mixture thereof.

20. (previously presented): A method according to claim 19, wherein the organic substrate ~~is or~~ comprises a polycarbonate, polyester, halogen-containing polymer, polyacrylate, polyolefin, polyamide, polyurethane, polystyrene, polyaramide, polyether or polysiloxane / silicone.

21. (currently amended): A method according to claim 1, wherein the initiator is a compound or combination of compounds selected from the classes consisting of the peroxides, peroxydicarbonates, persulfates, benzpinacols, dibenzyls, disulfides, azo compounds, redox systems, benzoin, benzil ketals, acetophenones, hydroxyalkylphenones, aminoalkylphenones, acylphosphine oxides, acylphosphine sulfides, acyloxyiminoketones, peroxy compounds, halogenated acetophenones, phenyl glyoxylates, benzophenones, oximes and or oxime esters, thioxanthenes, ferrocenes, titanocenes, sulfonium salts, iodonium salts, diazonium salts, onium salts, borates, triazines, bisimidazoles, polysilanes and dyes, and also corresponding coinitiators and/or sensitisers.

22. (previously presented): A method according to claim 1, wherein the initiator has at least one ethylenically unsaturated group.

23. (previously presented): A method according to claim 22, wherein the ethylenically unsaturated compound is used in the form of a monomer, oligomer and/or polymer.

24. (previously presented): A method according to claim 23, wherein the ethylenically unsaturated compound is a mono-, di-, tri-, tetra- or poly-functional acrylate, methacrylate or vinyl ether.

25. (previously presented): A method according to claim 1, wherein the plasma is run in a gas and the gas is air, water, inert gas, reactive gas or a mixture of the afore-mentioned gases.

26. (previously presented): A method according to claim 1, wherein the in the melt, solution, suspension or emulsion in method step b) contains the initiator(s) in a concentration of from 0.01 to 20 %.

27. (previously presented): A method according to claim 1, wherein the melt, solution, suspension or emulsion used in method step b) contains the unsaturated compound(s) in a concentration of from 0.1 to 30 %.

28. (previously presented): A method according to claim 1, wherein the melt, solution, suspension or emulsion used in method step b) additionally comprise other substances chosen from defoamers, emulsifiers, surfactants, anti-fouling agents, wetting agents and other additives customarily used in the coatings industry.

29. (previously presented): A method according to claim 1, wherein the thickness of the applied coating in the dry state ranges from a monomolecular layer up to 2 mm.

30. (previously presented): A method according to claim 1, wherein in method step c) irradiation is carried out using sources which emit electromagnetic waves of wavelengths in the range from 200 nm to 20 000 nm or by means of electron beams, optionally preceded by a drying step.

31. (previously presented): A method according to claim 1, wherein in method step c) irradiation is effected over the whole area or parts thereof.

32. (previously presented): A method according to claim 1, wherein in method step c) partial irradiation is effected and unexposed material is then removed.

33. (currently amended): A substrate having a functional layer, ~~obtainable~~ obtained by a method according to claim 1.

34. (previously presented): A product that has been provided with a coating in accordance with claim 1.

35. (cancelled).